

Cold Weather Overexposure

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SCICEX 1998
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SSN Hawksbill SCICEX 1998



New Wind Chill Chart

Wind (mph)

Temperature (°F)	Wind (mph)												
	Calm	5	10	15	20	25	30	35	40	45	50	55	60
40	36	34	32	30	29	28	28	27	26	26	25	25	25
35	31	27	25	24	23	22	21	20	19	19	18	17	17
30	25	21	19	17	16	15	14	13	12	12	11	10	10
25	19	15	13	11	9	8	7	6	5	4	4	3	3
20	13	9	6	4	3	1	0	-1	-2	-3	-3	-4	-4
15	7	3	0	-2	-4	-5	-7	-8	-9	-10	-11	-11	-11
10	1	-4	-7	-9	-11	-12	-14	-15	-16	-17	-18	-19	-19
5	-5	-10	-13	-15	-17	-19	-21	-22	-23	-24	-25	-26	-26
0	-11	-16	-19	-22	-24	-26	-27	-29	-30	-31	-32	-33	-33
-5	-16	-22	-26	-29	-31	-33	-34	-36	-37	-38	-39	-40	-40
-10	-22	-28	-32	-35	-37	-39	-41	-43	-44	-45	-46	-48	-48
-15	-28	-35	-39	-42	-44	-46	-48	-50	-51	-52	-54	-55	-55
-20	-34	-41	-45	-48	-51	-53	-55	-57	-58	-60	-61	-62	-62
-25	-40	-47	-51	-55	-58	-60	-62	-64	-65	-67	-68	-69	-69
-30	-46	-53	-58	-61	-64	-67	-69	-71	-72	-74	-75	-76	-76
-35	-52	-59	-64	-68	-71	-73	-76	-78	-79	-81	-82	-84	-84
-40	-57	-66	-71	-74	-78	-80	-82	-84	-86	-88	-89	-91	-91
-45	-63	-72	-77	-81	-84	-87	-89	-91	-93	-95	-97	-98	-98

Frostbite occurs in 15 minutes or less

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T = Air Temperature (°F)

V = Wind Speed (mph)

Serious Clothing



Clothing

- **If the rest of your body is covered, as much as 90% of the heat you lose can come from your head, so be sure to wear a wool cap that also covers your ears.**
- **Body heat is most likely to be lost from parts that have a lot of surface area in comparison to total mass-namely, the hands and feet. Keep them warm and dry.**
- **Dress in comfortable, loose layers. It is far better to wear layers of relatively light, loose clothing than one thick, heavy item. Between each layer there is a film of trapped air which, when heated by your body, acts as an excellent insulator. You can adjust your level of thermal requirements by adding/removing layers.**
- **Keep from overheating. Perspiration will result in rapid cooling.**
- **Avoid overdressing to reduce perspiration.**

What is Hypothermia?

HYPOTHERMIA:

- Hypothermia refers to subnormal central body temperature that may be due to overexposure to cold temperatures.
- In accidental hypothermia, the body temperature lowers progressively, and in extreme cases death from cardiac arrest may result.

Symptoms of Mild Hypothermia

- Shivering, conscious and alert, but may have difficulty speaking or walking. Body temperature is 90 to 95°F (32.2° to 35°C).
- Be aware that many household thermometers do not register temperatures below 94°F [34.4°C], so it may be hard to tell what the body temperature is.

Mild Hypothermia Treatment

- Wrap person in warm blankets or clothes
- Remove immediately to a warm shelter.
- Give warm, nonalcoholic drinks.
- Never allow victim to take a hot shower as it can cause cardiac arrest by forcing cold blood from the extremities toward the heart.

Severe Hypothermia Symptoms

- Body temperature below 90°F (32.2°C)
- Person stops shivering
- Altered mental status ranging from lethargy to unconsciousness
- Swelling of tongue

Severe Hypothermia Treatment

- Never allow victim to take a hot or warm shower as it can cause cardiac arrest by forcing cold blood from the extremities toward the heart
- Check vital signs.
- Respiration and pulse may be difficult to detect. Check carefully.
- If they appear completely absent and you are alone, call for help and then begin CPR.

Severe Hypothermia Treatment

- Take the person to a hospital emergency room immediately.
- When alone in an isolated area, getting the person to a medical facility is the highest priority.
- If help or a hospital is unavailable, wrap the person in warm blankets and take to a warm shelter. Try to avoid jostling the person when transporting. This may affect heart rhythm.

Severe Hypothermia Treatment

- Remove wet clothing and wrap the person in warm, dry blankets.
- Use hot water bottles or another person's body next to the victim to warm the victim's torso first.
- Avoid warming the extremities as induction of chilled blood will induce cardiac arrest.
- Rewarming takes several hours, with some risk of further fall in body temperature as well as shock, so it is always preferable to take the person to a hospital when possible.

Frostbite

- Frostbite occurs with prolonged exposure to subfreezing temperatures. The risk increases as the temperature declines or the wind (and wind chill factor) increases.

Frostbite Symptoms

- Progressive, painful loss of feeling leading to numbness
- White or blue appearance of the skin
- Firmness of the skin to the touch
- Loss of function

Frostbite Treatment

- Do not try to rewarm the affected parts. Gently wrap the affected parts in a blanket, dry clothing, or several layers of newspaper and transport the person to a hospital as soon as possible.
- Do not rub or massage the frostbitten area with anything, particularly not with snow as some home remedies suggest. Rubbing increases the risk of tissue damage. Snow merely adds to the danger of freezing.

Frostbite Treatment

- If treatment must be undertaken outside a hospital, bring the person indoors and begin warming the frostbitten parts immediately by immersing in warm water at a temperature of about 104°–108°F (40°–42°C). Rewarming may take 45 minutes to an hour.
- Successful rewarming leads to progressive return of function, color, and sensations and may result in blistering, which is normal. This process may be very painful; aspirin or acetaminophen may be given. Do not break the blisters.

Frostbite Treatment

- Do not expose frostbitten skin to the intense heat of a stove, radiator, open fire, or heating pad.
- If a hot beverage such as coffee or tea is available, offer it if the person is fully awake. Do not allow the person to drink alcoholic beverages.
- Apply dry, sterile gauze for protection.
- During travel to the hospital or indoors avoid refreezing of the frostbitten part.
- Treat hypothermia before treating frostbite.

What happens if you fall overboard in Freezing Water?

- **The first hazards to contend with are panic and shock. The initial shock can place severe strain on the body, producing instant cardiac arrest.**

The initial shock!

- **Survivors of cold water accidents have reported the breath driven from them on first impact with the water. Should your face be in the water during that first involuntary gasp for breath, it may well be water rather than air. Total disorientation may occur after cold water immersion. Survivors often report "thrashing helplessly in the water" for thirty seconds or more until they were able to get their bearings.**

Second phase cold water immersion

- **Immersion in cold water can quickly numb the extremities to the point of uselessness. Cold hands cannot fasten the straps of a lifejacket, grasp a thrown rescue line, or hold onto an overturned boat. Within minutes, severe pain clouds rational thought.**

Hypothermia in Freezing Water

- **And, finally, hypothermia (exposure) sets in, and without rescue and proper first aid treatment, unconsciousness and death.**

Body Temperature Symptoms

- **Normal body temperature is 98.6**
- **Shivering and the sensation of cold can begin when the body temperature lowers to approximately 96.5**
- **Amnesia can begin to set in at approximately 94**
- **Unconsciousness at 86**
- **Death at approximately 79 degrees**

What to do in the water?

- **Cold water robs the body's heat 32 times faster than cold air.**
- **If you should fall into the water, all efforts should be given to getting out of the water by the fastest means possible.**

Swim for shore?

- **Physical exercise such as swimming causes the body to lose heat at a much faster rate than remaining still in the water. Blood is pumped to the extremities and quickly cooled.**
- **Should you find yourself in cold water and are not able to get out, you will be faced with a critical choice - to adopt a defensive posture in the water to conserve heat and wait for rescue, or attempt to swim to safety.**

Avoid Swimming

- **Should you find yourself in the water, avoid panic.**
- **Air trapped in clothing can provide buoyancy as long as you remain still in the water.**
- **Swimming or treading water will greatly increase heat loss and can shorten survival time by more than 50%.**

- **The major body heat loss areas are the head, neck, armpits, chest and groin.**
- **If you are not alone, huddle together or in a group facing each other to maintain body heat and monitor each other for stress and focus on staying calm.**

Expected survival time in Cold Water

Water Temperature	Exhaustion or Unconsciousness in	Expected Survival Time
70-80° F (21-27° C)	3-12 hours	3 hours - indefinitely
60-70° F (16-21° C)	2-7 hours	2-40 hours
50-60° F (10-16° C)	1-2 hours	1-6 hours
40-50° F (4-10° C)	30-60 minutes	1-3 hours
32.5-40° F (0-44° C)	15-30 minutes	30-90 minutes
<32° F (<0° C)	Under 15 minutes	Under 15-45 minutes

From US Search & Rescue Task Force

Severn River 21-Feb-2003

